Initial Development of an Inventory to Assess Stress and Health Risk

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Abstract

In recent years, considerable attention has been given to the role of individual variables in the stress-illness relationship. Of particular value at this point are measurement tools and studies that evaluate the possible effects of two or more individual variables on health status. This study summarizes the initial development, psychometric properties, and validation of a brief, rationally derived, and reliable stress and health risk factor instrument. The 123-item instrument has shown criterion-related validity with both physical and psychological health outcomes in a study with 194 employees working in several large companies in the Los Angeles area. Implications for future development, application, and research are discussed.
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INTRODUCTION

Over the last two decades, an abundance of research has established the existence of a significant relationship between work/life stress and health status. This relationship has been notoriously weak with correlations ranging from .10 to .35.[1] Therefore, slightly less than 13 percent of the variance in health outcomes are accounted for by the assessment of work and life stress. Consequently, researchers have begun to explore additional moderating variables in the stress-illness relationship. These variables, along with measures of work and life stress, should increase predictions of both physical health and psychological well-being.

A variety of individual variables have been investigated in recent stress studies. Some of these have included social support,[1-6] family constitution,[7,8] coping skills,[9-18] job-individual fit,[19-22] personality,[23-31] personality hardiness,[32-36] and health habits.[37-44] These individual variables have consistently been found to moderate the short- and long-term health consequences of individuals experiencing work and life stress. It must be noted that these relationships have been established using diverse measures of stress and both subjective and objective health outcomes.

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Of particular value at this point are studies that attempt to measure and explore the effects of two or more of these individual variables on physical and psychological health outcomes. Although numerous measures and health risk appraisals exist, few have been developed that comprehensively and reliably assess more than a few of the individual moderating variables mentioned above. In general, the majority of assessment instruments and health risk appraisals have not been empirically developed, have focused on predictions of longevity or specific health proneness, and have not been adequately validated.[44-46]

This article discusses the development, psychometric properties, and initial validation of a brief inventory measuring a variety of cognitive and behavioral factors empirically demonstrated to moderate the stress-illness relationship. The instrument, the Stress Assessment Inventory (SAI), was designed to assess employee stress and health risk behavior within organizational health promotion and wellness programs. The instrument contains scales, theoretically derived, that appear to have adequate internal consistency reliability and criterion-related validity with diverse measures of health status. The 123-item instrument measures a total of fifteen scales including Stress, Global Health Practices, Exercise, Sleep/Relaxation, Preventive Hygiene, Nutrition/Eating, Social Support, Type A Behavior, Cognitive Hardiness, Intrusive Positive Thoughts, Intrusive Negative Thoughts, Avoidance and Problem-Focused Coping, Psychological Well-Being, Global Coping Index, and Response Bias. A summary of the scales and sample items are presented in Exhibit 1 of this article.

METHOD

Construction of the Stress Assessment Inventory

The Stress Assessment Inventory was developed following procedures recommended by Jackson.[47] In this regard, the items composing the scales are all theoretically derived and based on the cognitive-transactional theory base underlying stress research first proposed by Lazarus.[48] Items for the scales all reflect extensive empirical findings reported in literature on behavioral medicine pertaining to each of the topics represented by the scales including perceived stress, social support, health habits, Type A behavior, cognitive hardiness, and coping style.

Constructing the Item Pool

As a first step, over 1,000 items were gathered and adapted from numerous resources, including other psychological tests, health psychology, and behavioral medicine texts. Items were developed to cover the full range of characteristics defined by each scale construct. Each scale was carefully constructed by generating lists of items that appeared to have content validity with a priori scale definitions based on previous research by other investigators.

Reduction of the Item Pool

Items were deleted according to the following general criteria: too complicated for a respondent to understand; obvious desirability bias; lack of clear phrasing; and probable extreme endorsement frequency. Items were retained only if they exemplified the construct of the scale for which they were written and efforts were made to cover the broad range of beliefs and behaviors typified by a given scale. To achieve scale homogeneity, three health professionals with knowledge of the stress and health psychology literature were asked to independently sort these items into their rationally or theoretically appropriate categories. The criteria for inclusion required that the item be sorted into the "correct" scale by all of the independent judges. These judges also participated in the revising and editing of selected scale items for inclusion in the initial version of 300 items.

The initial 300-item version was sent by mail to 300 full-time employees in a variety of companies in the Los Angeles area. Included was a letter soliciting voluntary participation in a four-month study. A total of 196 of the inventories were returned (64%) during the first data collection period. Four months later the same employees were encouraged by mail to complete the same inventory. During the second data collection period, 146 of the original 196 (77%) were returned. The sample included 99 (67.8%) women and 47 (32.2%) men who ranged in age from 21 to 57 (mean = 35.6, SD = 8.7), with over 51.2 percent possessing a four-year college degree, and 54.6 percent working in a supervisory role.

Several statistical procedures were performed to analyze the reliability of the scales. These included inter-item correlations, item-scale correlations, factor analysis, and within-scale homogeneity (internal consistency reliability) calculations. To maximize homogeneity of the scales, Pearson correlations were calculated between the items and the total scores for each rationally derived scale. Items showing a correlation of lower than .30 were eliminated. Also, items which correlated .30 or higher with scales other than the one for which they were intended (or theoretically congruent) were also eliminated. Additionally, scales with internal consistency reliabilities (alpha) below .65 were automatically deleted. A total of five scales were dropped to form the final 123-item Stress Assessment Inventory so that the goals of ease of administration and brevity of the instrument could be more easily achieved.

To explore the psychometric properties of the revised instrument, the 123-item Stress Assessment Inventory was administered to 621 employees attending management training workshops in several large organizations in the Los Angeles area. Prior to each workshop, employees were sent a letter explain-

Exhibit 1
Scale Descriptions

The scales comprising the Stress Assessment Inventory are noted, along with the number of items scored on each scale.

Scale 1: Stress (6 items)

Stress is defined as the experience of major and minor irritants, annoyances, and frustrations of daily living. This scale measures self-reported hassles in six distinct areas: 1) health, 2) work, 3) personal finances, 4) family, 5) social obligations, and 6) environmental and world concerns. Respondents were asked to rate how frequently they experienced stress in the six areas on a 1 to 5 scale where 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Always. This scale is conceptually based on the *Hassles Scale*.[55] This scale has shown an internal consistency reliability of .67.

Scale 2: Global Health Practices (25 items)

Health habits are defined as the daily practice of specific behaviors hypothesized to be conducive to both physical and psychological well-being. The health habits scale is subdivided into four additional subscales: 1) Exercise, 2) Rest/Sleep, 3) Preventive Hygiene, and 4) Nutrition/Eating Habits. Respondents are asked to rate how frequently they practice specific health habits on a 1 to 5 scale where 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Always. This scale is conceptually based on earlier research on preventive health behaviors including that of Harris and Guten,[56] Belloc and Breslow,[57] Wiley and Camacho,[39] Williams and Wechsler,[58] and Pardine et al.[41] This scale is a composite of the four subscales and specific items on substance abuse (alcohol and drugs) and cigarette smoking. A sample item is: "Used nonprescription drugs (e.g., cocaine, marijuana) for recreational purposes." This scale has shown an internal consistency reliability of .82.

Scale 2a: Health Habits — Exercise (3 items)

This scale assesses the level and frequency of exercise a respondent engages in on a regular basis. A sample item is "Spent at least 15-30 minutes performing exercises that enhance muscle tone and the cardiovascular system (e.g., stretching, calisthenics, aerobics, etc.)." This scale has shown a high internal consistency reliability of .79.

Scale 2b: Health Habits — Sleep/Relaxation (5 items)

This scale assesses the frequency of obtaining adequate rest, sleep, and relaxation on a regular basis (e.g., receiving enough sleep at night; having enough time for daily rest and relaxation). A sample item is: "Received less sleep than required because you stayed up too late or had to get up too early." This scale has shown a moderately high internal consistency reliability of .71.

Scale 2c: Health Habits — Preventive Health Practices (6 items)

This scale assesses the frequency of using sound health hygiene practices on a regular basis (e.g., avoiding others who are infected or ill; seeking regular health checkups; taking required prescription medications if necessary). A sample item is "Maintained close, physical, or intimate contact with someone who was infected, sick, or ill." This scale has shown a moderate internal consistency reliability of .70.

Scale 2d: Health Habits — Nutrition/Eating (8 items)

This scale assesses the frequency of eating well-balanced meals and nutritious foods on a regular basis. A sample item is: "Limited my intake of dietary saturated fats, cholesterol, salt, sugar, and calories." This scale has shown a reliability of .70.

Scale 3: Social Support Network (18 items)

This scale assesses the satisfaction and number of significant others that can be counted on for emotional support, advice, information, unconditional love, and assistance on a regular basis. The conceptual framework for this scale was derived from the framework of Sarason et al., 1983. The overall social support network score is determined by the relative use and satisfaction across five groups of individuals including: 1) immediate boss or supervisor, 2) other people at work, 3) spouse or lover, 4) family members and relatives, and 5) other friends. Respondents are asked how relative use of social supports on a 1 to 5 scale where 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Always. Additionally, respondents are asked to rate how satisfied they are with these groups on a 1 to 5 scale where 1 = Not at all Satisfied, 2 = Slightly Satisfied, 3 = Moderately Satisfied, 4 = Very Satisfied, and 5 = Extremely Satisfied. This scale has shown a high internal consistency reliability of .83.

Scale 4: Type A Behavior (10 items)

This scale assesses the frequency of specific behaviors in response to perceptions of daily life challenges, threats, and stresses including some or many of the following: being hard-driving, competitive, impatient, quick to express anger, doing things quickly, working very long hours, pushing one's self to their limit, and dwelling on work and family related problems. Respondents are asked to rate how often they express specific behaviors on a 1 to 5 scale where 1 = None of the Time, 2 = A Little of the Time, 3 = Some of the Time, 4 = Most of the Time, and 5 = All of the Time. A sample item is: "I am quick to experience and express my frustration and anger." This scale has shown a moderately high internal consistency reliability of .82.

Scale 5: Cognitive Hardiness (30 items)

This scale assesses the possession of specific attitudes and beliefs based upon the concept of personality hardiness attributed to Kobasa and her colleagues.[31] This scale is composed of attitudes and beliefs about work and life that are relatively enduring from day-to-day and include: 1) Involvement — commitment, as opposed to alienation, to one's work, family, self, hobbies; 2) Challenge — attitudes around viewing life changes as challenges as opposed to threats; 3) Control — beliefs that one has a sense of control over significant outcomes in life. Respondents are asked to rate how strongly they agree with specific statements about their beliefs on a 1 to 5 scale where 1 = Strongly Agree, 2 = Agree, 3 = Neither Agree nor Disagree, 4 = Disagree, and 5 = Strongly Disagree. A sample item is: "My involvement in nonwork activities and hobbies provides me with a sense of meaning and purpose." This scale has shown a high internal consistency reliability of .83.

Scale 6: Coping Style (20 items)

This scale assesses the frequency of using both emotion-focused and problem-focused coping strategies on a regular basis in the face of daily work and life challenges, threats, and stresses. The four subscales of the Coping Style scale include: 1) Intrusive positive thoughts (alpha .69); 2) Intrusive negative thoughts (alpha .72); 3) Avoidance (alpha .70); and 4) Problem-focused coping (alpha .69). Respondents are asked to evaluate how often they tend to use the specific approach or technique to effectively cope with daily work and life stress on a 1 to 5 scale where 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Always.

Scale 7: Psychological Well-Being (12 items)

This scale assesses the respondent's overall life satisfaction and absence of psychological distress on a regular basis. It is characterized by satisfaction with one's self, ability to enjoy life, and feeling happy with one's family, work, interpersonal relationships, and achievements. Respondents are asked to evaluate how often they tend to experience specific feelings and emotions on a 1 to 5 scale where 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Always. Sample items include: "Feeling positive, confident, and secure with yourself," "Pleased with your life overall," and "Able to relax and enjoy yourself without worry." This scale has shown a very high internal consistency reliability of .93.

Scale 8: Response Distortion Bias (5 items)

This scale assesses the tendency of respondents to respond in a manner that might be interpreted to be biased or distorted. The items are based conceptually on the *Crowne Marlowe Social Desirability Scale*.[58] Each item attempts to discriminate against response threats that might confound interpretation of the instrument by asking respondents to endorse a series of True and False statements that most likely have only one correct answer. Sample items include: "I have never lied in my life," "I always have bad thoughts about other people," "I have never said bad things about someone else." High scorers tend to endorse items that would appear uncharacteristic for most individuals raising the likelihood that the respondent was tired, made mistakes in reading the items, or is responding in a manner that could be distorted.

ing the purpose of the testing, assuring them of confidentiality, and requesting their participation. Employees were also told that they could receive confidential written feedback regarding their results. A total of 466 were returned for a response rate of 74.9 percent. The mean age of the sample was 35.6 years (SD = 9.35) which included 218 females and 156 males employed in primarily professional and management positions. The employee sample was well educated (62% possessed at least a two-year college degree) and was racially diverse (67% Caucasian, 10% Black, 10% Hispanic, 12% Asian, and one percent other).

Means, Standard Deviation, and Reliability of the Subscales

Tables 1 and 2 summarize the means, standard deviations, and internal consistency reliabilities (Cronbach's alpha) of the Stress Assessment Inventory subscales. Since items were selected on the basis of high correlations with the total score on its substantiative scale, each Stress Assessment Inventory scale should demonstrate at least moderate levels of internal consistency as gauged by statistical

Table 1

Means and Standard Deviations of the Stress Assessment Profile (N = 466)

Scale	Mean	S.D.
Stress	17.01	3.83
Health Habits		
Global Health Habits	90.21	10.01
Exercise	8.63	3.21
Rest/Sleep/Relaxation	16.59	3.53
Eating/Nutrition	28.24	5.29
Preventive Hygiene	22.95	4.04
Social Support Network	45.91	9.89
Type A Behavior	30.69	5.98
Cognitive Hardiness	97.32	11.45
Coping Style		
Intrusive Positive Thoughts	16.19	2.78
Intrusive Negative Thoughts	14.42	3.12
Avoidance	14.81	2.79
Problem-Focused Coping	16.60	2.84
Psychological Well-Being	43.01	8.93

homogeneity measures. The average internal consistency reliability (Cronbach's alpha) across all scales was .76 with a range from .67 to .93. As evident from these data, and despite complications arising from the changing nature of attitudes and behaviors, both stability and consistency results obtained on the Stress Assessment Inventory proved satisfactory.

Table 2

Internal Consistency Reliabilities of the Stress Assessment Profile (N = 466)

Scale	Reliability (ALPHA)
Stress	.67
Health Habits	
Global Health Habits	.82
Exercise	.79
Rest/Sleep/Relaxation	.71
Eating/Nutrition	.70
Preventive Hygiene	.70
Social Support Network	.83
Type A Behavior	.82
Cognitive Hardiness	.83
Coping Style	
Intrusive Positive Thoughts	.69
Intrusive Negative Thoughts	.72
Avoidance	.70
Problem-Focused Coping	.69
Psychological Well-Being	.93

Scale Intercorrelations and Overlap

Table 3 summarizes scale correlations using the previous sample of 466 employees. Small to moderate correlations exist among the scales not theoretically associated with each other. Moderately high correlations are notable among scales expected to show such relationships. Based upon previous research, it is expected that

Table 3

Intercorrelations of the SAI Scales (N = 466)

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Stress		-.48*	-.15*	-.51*	-.37*	-.31*	-.24*	.35*	-.46*	-.18*	.35*	-.26*	.01	-.47*
2. Health Habits			.45*	.64*	.72*	.81*	.32*	-.43*	.39*	.22*	-.31*	.11	.08	.38*
3. Exercise				-.02	.01	.23*	.19*	-.10	.24*	.21*	-.09	.20*	-.10	.16*
4. Sleep/Relaxation					.53*	.37*	.19*	-.37*	.27*	-.01	-.30*	-.01	.01	.32*
5. Health Hygiene						.40*	-.05	-.30*	.24*	-.10	-.27*	-.03	.01	.22*
6. Eating/Nutrition							.29*	-.37*	-.28*	.07	-.17*	-.09	.09	.31*
7. Social Support								-.14	.49*	.29*	-.16*	.16*	.23*	.46*
8. Type A Behavior									-.22*	.05	.46*	-.16*	.15*	-.23*
9. Cognitive Hardiness										.44*	-.38*	.34*	.23*	.67*
10. Intrusive Thoughts (+)											.08	.55*	.49*	.51*
11. Intrusive Thoughts (-)												-.09	.22*	-.21*
12. Avoidance													.38*	.44*
13. Problem-Focused Coping														.41*
14. Psychological Well-Being														

* p < .01

moderate correlations would exist between the Stress, Social Support, Global Health Habits, Cognitive Hardiness, Coping Style, and Psychological Well-Being scales. Such correlations are apparent upon inspection of Table 3.

Relationship with Demographic Variables

Of the demographic variables included, only a few significant correlations were found. Age was significantly correlated with both the Type A Behavior ($r = -.16$, $P < .05$) and Sleep/Relaxation scales ($r = .12$, $P < .05$). Education was significantly correlated with Global Health Practices ($r = .13$, $P < .05$) and Social Support ($r = .20$, $P < .05$).

Two significant differences were observed with respect to sex and the health habits scales. Men reported to receive significantly more rest and sleep (F [1, 445] = 8.35, P = .004) and to engage in more frequent and regular exercise than women (F [1,445] = 9.07, P = .003). These differences may be a function of the largely professional working employee sample used in this study. Overall, these differences lend support to the general lack of sex, cultural, and racial bias in these scales.

Factor Structure of the Stress Assessment Profile

The factor structure of the Stress Assessment Inventory scales is presented in Table 4. Responses to 13 of the scales were factor analyzed using principal factoring with iteration and varimax rotation. Since the Psychological Well-Being scale was developed and conceptualized as a dependent outcome measure, it was not included in the factor analysis.

The initial analysis extracted three major factors that had eigenvalues greater than or equal to 1.0 and accounted for 60.1 percent of the total variance. The stability of these factors was tested by factor analyzing the scales from different subsamples of the initial sample (N = 466). In each analysis, the factor structure was similar to the one in Table 4.

Factor 1 represented the behavioral health habits scales composing the Stress Assessment Inventory. These included the Global Health Practices scale as well as its four subscales: Exercise, Sleep/Relaxation, Eating/ Nutrition, and Preventive Hygiene. Factor 2 represented the adaptive cognitive and behavioral resistance resources including the Social Support, Cognitive Hardiness, and three of the Coping Style scales. The only

Coping Style scale that did not load on this factor was Intrusive Negative Thoughts. Finally, factor 3 represented the aversive cognitive and behavioral scales including Stress, Type A Behavior, and Intrusive Negative Thoughts.

The factor structure underlying the Stress Assessment Inventory suggests the emergence of three distinct factors. The first factor, which included the health habits scales, accounted for 33 percent of the total variance. This factor appears to represent major lifestyle behaviors that have been postulated to have both direct and indirect effects on well-being.

It appears that the major difference between the scales contributing to factors two and three may reflect a basic orientation between adaptive and maladaptive coping approaches involving specific cognitions, behaviors, and emotions. The scales contributing to factor two, Intrusive Positive Thoughts, Avoidance, and Cognitive Hardiness, appear to be largely adaptive resistant resources associated with health status. On the other hand, the scales loading on factor three, Intrusive Negative Thoughts, Type A Behavior, and Stress, for example, share a propensity to approach the world in a more critical, pessimistic, impatient, and time pressured manner.

RESULTS

Criterion-Related Validity of the Stress Assessment Profile

The criterion-related validity of the Stress Assessment Inventory was explored in a separate study of 194 professional employees employed in six large companies in the health care, aerospace, and service industries. During 1986, 262 full-time professional employees attending management training workshops in each of the six companies were sent a copy of the Stress Assessment Inventory and separate measures of physical and psychological health. Prior to each management training class, respondents were sent a letter

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Table 4

Factor Structure of the Stress Assessment Inventory Scales
(N = 466)

Rotated Factor Matrix	Factor 1	Factor 2	Factor 3
Global Health Practices	.93154	.16180	-.27731
Eating/Nutrition	.79149	.17515	-.11829
Preventive Hygiene	.71130	-.01786	-.29121
Rest/Sleep/Relaxation	.57952	-.09072	-.49602
Exercise	.38561	.32987	.07534
Intrusive Positive Thoughts	.10172	.82705	.04704
Avoidance	-.11453	.74400	-.21155
Problem-Focused Coping	.09933	.70431	.35024
Cognitive Hardiness	.16992	.60639	-.50070
Social Support	.27003	.48545	-.19272
Intrusive Negative Thoughts	-.06493	.03266	.81052
Type A Behavior	-.27352	.00090	.64923
Stress	-.30676	-.25239	.62690

explaining the purpose of the study, assuring them of confidentiality, and requesting their participation on a voluntary basis. Respondents were also told that they could receive confidential written feedback regarding their results at the end of the management training program.

A total of 194 questionnaires were returned for a response rate of 74 percent. This moderately high response rate is most likely attributed to: 1) separate mailings prior to each management training class; 2) phone confirmations regarding subsequent attendance to the classes; and 3) personalized written feedback provided to each participant. The mean age of the employee sample was 38.3 years (SD = 8.95). This professional employee sample tended to be gender balanced (58% men and 42% women), well educated (62% possessed at least a two-year college degree), and racially diverse (67% Caucasian, 10% Black, 10% Hispanic, 12% Asian, and one percent other).

Psychological distress was assessed by the Hopkins Symptom Checklist.[49] This measure has shown a moderately high internal consistency reliability (Cronbach's alpha) of .85 and a test-retest reliability of .75 over a six-months and growing, criterion-related validity with normal adult samples.[49]

Physical illness was adapted by a measure developed by Greenberg.[50] This eight-item scale asked respondents to endorse frequency-specific categories of illness or symptoms of illness. These illness categories included: 1) injuries/accidents; 2) infection (bacterial or viral); 3) respiratory; 4) gastro-intestinal; 5) neurological; 6) cardiovascular; 7) change in existing medical condition; and 8) miscellaneous physical symptomatology. This eight-item scale is answered on a five-point continuum (e.g., "no times," "one time," "two times," "three times," "four or more times") over three months. This scale has shown moderately high internal consistency reliability (Cronbach's alpha) of .73.

Psychological well-being was measured using the newly developed 12-item Stress Assessment Inventory scale of the same name. This scale assesses global work and life satisfaction and has shown high internal consistency reliability (Cronbach's alpha) of .93. For each of the 12 items, respondents are instructed to circle how frequently they have experienced specific feelings of work and life satisfaction on a 1 to 5 scale of 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, and 5 = Always. Sample items include: "Pleased with your life overall," "Genuinely enjoying the things you are involved in," "Feeling positive, confident, and secure with yourself," and "Feeling satisfied with personal and professional accomplishments."

Stepwise multiple regression analysis was used to determine the unique contributions of the Stress Assessment Profile scales to the prediction of physical and psychological health outcomes. Table 5 summarizes these multiple regression analyses with the

Stress Assessment Inventory scales as the independent variables and health status (psychological distress, physical illness, and psychological well-being) as the dependent variables.

Additional stepwise multiple regression analyses were conducted with relevant demographic variables (age, sex, education, ethnicity) entered in the first step. Although the multiple R's were larger, there were no other differences in the contributions of the Stress Assessment scales to the dependent variables.

DISCUSSION

This article summarizes the development, psychometric properties, and initial criterion-related validation of a brief stress and health risk factor assessment instrument, the Stress Assessment Inventory. This rationally-derived inventory is composed of scales hypothesized to moderate the stress-illness relationship based upon a review of the

Table 5

Multiple Regression Analysis with Psychological Distress, Physical Illness, and Psychological Well-Being as Dependent Variables (N = 198)

Scales	Psychological Distress			
	Multiple R	RSQ	RSQ Change	F
Cognitive Hardiness	.58	.33	.33	86.6*
Health Habits	.71	.51	.17	58.5*
Stress	.75	.55	.05	19.4*
Intrusive Positive Thoughts	.78	.60	.04	19.1*

Scales	Psychological Well-Being			
	Multiple R	RSQ	RSQ Change	F
Cognitive Hardiness	.75	.56	.56	218.8*
Health Habits	.76	.58	.02	8.5*
Social Support	.77	.59	.01	6.1*

Scales	Physical Illness			
	Multiple R	RSQ	RSQ Change	F
Health Habits	.48	.23	.23	49.4*
Stress	.53	.28	.06	14.1*
Avoidance	.59	.34	.06	15.2*

*p < .01

behavioral medicine literature. The Stress Assessment Inventory demonstrated adequate internal consistency reliability and criterion-related validity with a variety of physical and psychological health outcomes in separate studies with professionally employed men and women. Although additional research is warranted, the Stress Assessment Inventory appears promising for subsequent research in behavioral medicine as well as for possible use in organizational health promotion and wellness programs.

Although the initial validation results of the Stress Assessment Inventory appear promising, several limitations need to be briefly pointed out. First, only self-reported health outcome data were collected. For example, endorsement of illness symptoms may not be the same as illness per se. Future research should also include objective measures of both physical health and psychological well-being to strengthen the criterion-related validity of this assessment instrument. Secondly, the samples used in the development and initial validation of the Stress Assessment Inventory are fairly homogenous in nature, and to an extent, self-selected. Additional validation research is currently underway with more diverse samples to minimize possible self-selection issues.

Findings from the initial criterion-related validation pilot study suggest that different subscales contribute differentially to specific self-reported health outcomes. These results have important implications should they be replicated in future research studies. Although Global Health Practices contribute to predictions of all health outcomes in the regression analysis (see Table 5), other scales appear to contribute to specific psychophysiological symptomatology.

For example, the Avoidance coping style scale significantly contributes to predictions of physical illness in the multiple regression analysis (see Table 5). Respondents who are able to minimize the impact of work and life stress by using avoidance techni-

ques reported significantly less physical illness than those who were unable to do so. This finding is consistent with current research on coping effectiveness that suggests that avoidance and denial processes may result in stress reduction, increased hope, and self-efficacy over unpleasant emotions, particularly when events are beyond one's control.[51] Similarly, the area of Intrusive Negative Thoughts contributes significantly to predictions of psychological distress (see Table 5) but no other self-reported health outcome. This finding is consistent with the work of Beck,[52] Ellis,[53] and others who have reported significant correlations between holding irrational thoughts and measures of psychological distress (e.g., depression, anxiety).

Finally, Cognitive Hardiness significantly contributed to predictions of both psychological distress and well-being but not physical illness (see Table 5). This finding extends the criterion-related validity of the hardiness construct to outcomes other than physical illness.[32,33,36] Additionally, the Cognitive Hardiness scale has also shown convergent validity with the global personality hardiness scale[32] in one recently unpublished study with 239 police officers.[54] The Cognitive Hardiness scale was significantly correlated with the global Kobasa hardiness scale;[33] commitment and control subscales were r's = .43, .40, .50, respectively, all p's < .01.

An enormous amount of work remains to assess the robustness and efficiency of the Stress Assessment Profile through a variety of cross-validational and cross-generalizational studies. Additional work is required to substantiate the predictive relationship between the inventory and a variety of both objective and subjective measures of health status. The following research areas appear most critical to establish the utility of this stress and health risk factor inventory.

First, future research on the Stress Assessment Inventory should focus

on the internal structure, stability of scales over time, and the independence of the various subscales. Additional factor analytic techniques with larger sample sizes and diverse adult groups should be used to clarify the psychometric properties and sources of variance of the subscales. Additional studies of convergent validity are required to demonstrate that the scales are useful for the measurement of the diverse constructs for which they were based.

Second, the predictive utility of the Stress Assessment Inventory with diverse health outcome measures currently in use in research and clinical practice requires further attention. Finally, numerous possibilities exist for incorporating the inventory into organizational studies on employee health promotion and wellness. It is recommended that, when possible, such studies utilize longitudinal or prospective designs and include multiple measures of health status and organizational effectiveness (e.g., absenteeism, health care costs, disability claims, etc.).

SO WHAT? Implications for Health Promotion Practice & Research
Better assessment tools measuring a variety of psychosocial risk factors related to health are required in the fields of health psychology and behavioral medicine. These measures should be theoretically derived and have demonstrated reliability and criterion-related validity to warrant being used by both researchers and practitioners.

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